

Ministry of Science and Higher Education of the Russian Federation
Federal State Autonomous Educational Institution of Higher Education
Perm National Research Polytechnic University

Electrical Engineering Faculty
Department "Information Technologies and Automated Systems"



APPROVED BY
Pro-rector for Academic Affairs
N.V. Lobov

[Signature]
11 2021

INTERNSHIP PROGRAM

Form of internship: Work experience training

Type of internship: Research

Format: Discontinuously by the semesters

Workload: 6 CU

Duration of Internship: 216 hours (6 CU)

Level of Higher Education: Bachelor's Degree

Form of Education: Full-time

Training program (degree): 15.03.06 Mechatronics and Robotics

Direction: Robotics in computer-aided manufacturing

1 General Provisions

In accordance with the Federal Law from December 29, 2012 № 273-FL “About education in the Russian Federation” as amended on July 1, 2020 and “Regulation of students’ practical field experience”, approved by the Order of Ministry of science and higher education of the Russian Federation and the Ministry of Education of the Russian Federation from August 5, 2020, № 885/390, internship is related to the students’ practical field experience at mastering educational program in conditions of students’ performance of definite kinds of work associated with the future professional activity and oriented to formation, consolidation and development of practical skills and competences on the profile of the corresponding educational program.

1.1 Goals and Objectives of the Internship

The goal of the Research Internship is to form professional competences of the trainees in the process of performance of definite kinds of work providing effective self-development in scientific research, educational and training and professional activities in the sphere of informatics and telecommunication technologies.

Objectives of the internship:

- to perform the kinds of work defined by the individual task for internship (R&D) providing the achievement of training results planned in competency-based format and the reporting form and collection of data to prepare graduate qualification work;
- to prepare a report involving the materials of the work stages within scientific-research work (R&D), clarifying the level of prescribed competences mastering;
- to process and present during defense the obtained results.

1.2 The Place of Internship in the structure of the Educational Program

1.2.1 **Block (module):** B 2 “Internship”

1.2.2 **Year of studies:** 4 (7-8 semesters)

1.2.3 **Relationship with Courses of Curriculum**¹

Table 1 Relationship with Courses of Curriculum

| The list of the preliminary disciplines | The list of subsequent disciplines |
|--|---|
| Study and Research Work Electronic Devices of Mechatronic and Robotic Systems Metrology, Standardization and Certification | Production Pre-degree Internship |

1.3 Methods of carrying the Internship

Field or stationary.

1.4 Place of carrying the Internship

Research internship is held in the Department “Information Technologies and Automated Systems” of PNRPU. It is organized discontinuously by the semesters parallel with subject mastery, in the practical training within practice period free of theoretical instruction, in accordance with the approved curriculum.

The Internship for students with special needs and disabilities is carried out taking into peculiarities of their mental and physical development, individual abilities and state of health.

¹ Exclusively disciplines forming the same competences.

1.5 The Forms of Internship Report

Written report on the internship in the form of R&D reports; 7 semester – grading credit, 8 semester – grading credit.

2 Planned results of Training during the Internship

Table 2 Planned results of Training during the Internship

| Competences | Indicator of attaining Competence which the Planned Results of Training are correlated with | List of Planned Results of Training during the Internship |
|---|---|---|
| <p>PC-1. Is able to participate in scientific research and projects development, to make theoretical research and computing experiments using standard software in order to produce mathematical models of processes and objects of mechatronics and robotics.</p> | <p>IA-2_{pc-1}. Is able to summarize, analyze and systematize information for the preparation of analytical reviews on a given topic, use standard software tools for mathematical modeling of processes and objects of mechatronics and robotics.</p> <p>IA-3_{pc-1}. Has the skill of independent study, critical reflection and systematization of scientific and technical information, conducting theoretical research and computational experiments in accordance with the use of selected standard software tools.</p> | <p><i>Have the skills</i> to perform labor actions of labor functions: - Labor function A/01.5 – To execute performing of the works on processing and analysis of research and development information and findings of professional standard PS 40.011 Specialist in scientific research and projects development, defined in individual internship task for a student by its supervisor.</p> |
| <p>PC-2. Is able to perform calculations and design of individual units and devices, as well as select standard measuring and computer equipment for the implementation of mechatronic and robotic systems.</p> | <p>IA-2_{pc-2}. Is able to apply techniques and tools for designing individual units and devices of mechatronic and robotic systems.</p> <p>IA-3_{pc-2}. Has the skill of use of standard measuring and computer equipment in designing and calculating individual units and devices of mechatronic and robotic systems.</p> | <p><i>Have the skills</i> to perform labor actions of labor functions: - Labor function A/01.6 – To choose software environment to manage flexible production systems in engineering of professional standard PS 40.152 Specialist in design of flexible production systems in engineering, defined in individual internship task for a student by its supervisor.</p> |

3 Internship Content

3.1 The Content of Internship Work Types

The main goal of work experience internship (scientific-research work) is to form the defined competences that provide training of bachelors to scientific-research work in accordance with the profile of baccalaureate as well as collection of data, research practice necessary to write bachelor's thesis on training program 15.03.06 Mechatronics and Robotics. Work experience internship (R&D) is oriented towards independent work which is structured according to the types of work that constitute the basis of the bachelor's thesis.

The Internship content in accordance with the types of work and the forms of reporting includes 4 stages and is given in Table 3.1.

Table 3.1 The Internship content of work types and the forms of reporting

| Name of the internship stage | Main types of work of students (other work of person passing internship, except contact work, with teacher staff) | Volume in hours or work days | Forms of reporting |
|------------------------------|---|------------------------------|-------------------------------------|
| Stage 1 | <p>The problem analysis, selection of the research area, research plan development. Selection of the research area, namely:</p> <ul style="list-style-type: none"> – development of possible research areas; – substantiation of optimal selected research area; – formulation of project purposes, goals, object and subject or the research. <p>Selection of methods and principles of the research. Research plan development.</p> | 56 hours | Research plan |
| Stage 2 | <p>Theoretical analysis of subject area. Substantiation of the chosen topic relevance. Refinement of the purpose, tasks, objects and subject of the research. Selection and review of the domestic and abroad scientific, monographic literature and periodicals.</p> | 18 hours | Conversation, mark in research plan |
| | <p>Preparation for declamation on a practical lesson with review of current researches and scientific and technical achievements within subject area. Declamation on a practical</p> | 18 hours | Conversation, mark in research plan |

| | | | |
|----------------|--|------------------|-------------------------------------|
| | lesson of the analysis results of current researches and scientific and technical achievements within subject area. | | |
| | Collection, processing, analysis and systematization of initial information on subject area. Preparation of the interim report (internship report). | 16 hours | Written report. Grading credit |
| Stage 3 | Experimental research of the subject area. Carrying out of scientific research, including collective form. Evaluation of the obtained results with a view of their accuracy and reliability. | 28 hours | Conversation, mark in research plan |
| | Preparation for declamation on a practical lesson with interim results of experimental research of the subject area. | 28 hours | Conversation, mark in research plan |
| Stage 4 | Summing up and evaluation of the research results. Comparison of the results of the information resources analysis with results of theoretical and experimental researches Evaluation of the effectiveness of the obtained results. Elaboration of recommendations for the use of the results. Preparation of the final report and its defence. | 52 hours | Written report. Grading credit |
| TOTAL | | 216 hours | Grading credit |

3.2 The Structure of Internship, including Contact Work of Students with Teaching Staff

Structure and Workload of Internship is given in the Table 3.2.

Table 3.2 Structure and Workload of Internship

| Sections (stages) of internship | Number of academic hours | | | | | Summative assessment |
|---|--------------------------|--------------|-----------|----------|--|------------------------|
| | Total | Contact work | | | The other kinds of work of trainee during internship | |
| | | Lectures | PL | CIW | | |
| Stage 1. The problem analysis, selection of the research area, research plan development. | 56 | - | 14 | 2 | 40 | |
| 1.1. Practical lessons (in accordance with training schedule) | - | - | 14 | - | 14 | |
| 1.2. Preparation to practical lessons, study of theoretical recourses. | - | - | - | - | 28 | |
| Stage 2. Theoretical analysis of subject area. | 52 | - | 20 | - | 30 | Grading credit 2 hours |
| 2.1. Practical and seminar lessons (in accordance with training schedule) | - | - | 20 | - | 10 | |
| 2.2. Preparation to seminars. | - | - | - | 2 | 20 | |
| Stage 3. Experimental research of the subject area. | 56 | - | 14 | 2 | 40 | |
| 3.1. Practical lessons (in accordance with training schedule) | - | - | 14 | 2 | 10 | |
| 3.2. Individual research work, individual tasks performing. | - | - | - | - | 30 | |
| Stage 4. Summing up and evaluation of the research results. | 52 | - | 8 | - | 42 | Grading credit 2 hours |
| 4.1. Writing report on R&D and preparation of presentation | - | - | 6 | - | 42 | |
| 4.2. Providing the advisor with report on R&D | - | - | 2 | - | 1 | |
| 4.3. Defense of report on R&D within practical and seminar lessons (in accordance with training schedule) | - | - | - | - | 1 | |
| Total | 216 | - | 56 | 4 | 152 | 4 |

3.3 Content of stages and topics of the Internship

PL – 56 hours, ISW - 152 hours.

Topic 1. General Concepts in Scientific Research Area.

Concept “research”. Singular character of scientific research, its characteristics. Theoretical and empirical scientific studies. Objectives and goals of scientific research.

Object and subject of the research. Scientific problem. Hypothesis of the research. Correlation of purpose, subject and hypothesis of the research.

Topic 2. Methods of Scientific Research.

General methods of empirical research, their characteristics. Distinct methodologies implementing general methods of the research. The statistical processing of the research results (the Student’s t’ test, factorial test, correlation analysis; clustering).

Methods of the results presentation (Diagram, graphics, histographic analysis). Computer processing.

Topic 3. Intellectual Processes in Scientific Research.

Reading as a kind of cognitive activity providing mining of verbal information. Types of reading (Revision reading, reading for specific information, exploratory reading, critical reading) and their characteristics. General cognitive, intellectual processes (actions): analysis, synthesis, generalization, classification, prognostics, target setting, etc.

Topic 4. Organization and Planning the Study

Organization and planning author’s research. Objective, tree of objectives and their realisation in the research process. Defining research problems, goal setting, hypothesizing / dismissal. Selection of research methods corresponding to the objective. Procedure of research practice. Results processing. Experimental statistics. Computer aided techniques and computerized presentation of the research results. Carrying out a comparative study of the research results in relation to other studies on the topic. Evaluation of the effectiveness of the obtained results. Elaboration of recommendations for the use of the results. The use of Microsoft Office tools in rendering the report on fundamental investigation. Presentation of the research results with the use of computer aided techniques and supplementary presentation equipment. Data visualization: general trends, rules and recommendations.

Preparation of R&D report (requirements, regulations and formatting rules), defense.

3.4 Topics of the Practical and Seminar Lessons

Table 3.3 List of Topics for Practical Lessons

| № | Practice Topic № | Topic Name of Practical Lesson |
|----------|-------------------------|--|
| 1 | 1 | Definition of the research topic. Development of the research plan-schedule |
| 2 | 1 | Analytical reviewing of domestic and abroad information recourses. Formulation of the research scientific problem. |
| 3 | 2 | Selection of investigation method. |
| 4 | 2 | Preparation of the research program. |
| 5 | 2 | Setting the research program. Presentation of the research program with the use of computer aided techniques and supplementary presentation equipment. |
| 6 | 2 | Preparation of the research tool. |
| 7 | 3 | Data processing: preparation of technical task and statistical processing of quanta data. Dense qualitative data description. |
| 8 | 3 | Analysis of the research data. |
| 9 | 3 | Comparative analysis of diverse researches data. |
| 10 | 3 | Data visualization |
| 11 | 4 | Evaluation of the effectiveness of the obtained results and elaboration of recommendations for the use of the results. |

| | | |
|----|---|---|
| 12 | 4 | Preparation of R&D final report. Presentation of the research results with the use of computer aided techniques and special presentation equipment. |
|----|---|---|

3.5 Content of Organizational Arrangements for the Internship. Methodological Guidelines for Students in the Internship

1. At the first group lesson the teaching familiarizes the students with:
 - topics of R&D;
 - objectives and goals of the internship;
 - stages of R&D organization;
 - requirements of R&D documentation;
 - requirements of the scientific and regulatory documentation used;
2. The trainee students attend all practical lessons in accordance with class schedule and perform individual internship tasks within following directions:
 - substantiation of relevance of the research project;
 - development of the research program: defining the object and main goals, object, subject, research hypothesis, the method selection or the complex of methods;
 - building of conceptual model of measurable indicators in accordance with research goals and its hypothesis;
 - definition of selection principles of information resources (respondents, documents);
 - selection and description of collection and processing data methods.
3. The week before the fixed date for the R&D credit, the students submit their R&D reports to the department. The reports are reviewed by scientific advisers and are subject to prior evaluation and defense after verification of their conformity with the requirements. The R&D grading credit takes place in the 6th semester in the form of the R&D final stage results defense in the framework of practical lessons or control independent work (CIW).

3.6 Topics of individual assignments for internship

1. Methods for determination productivity measures, reliability figures, technical effectiveness of flexible production systems.
2. List of functions of flexible production systems.
3. Methods for revealing functions of flexible production systems.
4. Methods for revealing work center efficiency of flexible production systems.
5. Methods for counting norm coefficient of shift-working arrangements of flexible production systems.
6. Methods for defining standardization and unification indicators of flexible production systems.

4 The Assessment Tool Fund for the Interim Students Assessment in Internship

Interim internship's assessment is organised in the form of written report defense on the R&D Internship.

Assessment criteria of mastering competencies according to each element (indicator of attaining results of learning) during practical training are given in Table 4.1.-4.2.

Table 4.1 Assessment criteria for the levels of competency development during the internship in 7th semester

| Activity, control tool | Evaluation tools and scores | | |
|------------------------|-----------------------------|----------|------|
| | Threshold | Advanced | High |

| Organization stage | Organization meeting | Assistance | Assistance and Posed Questions | Assistance, Proposal of Research Topic |
|---|---|---|---|--|
| <i>Number of points</i> | | <i>1</i> | <i>2</i> | <i>3</i> |
| Stage 1 (semester 7). The problem analysis, selection of the research area, research plan development | | | | |
| Possible research directions reviewing. Performing of substantiation of optimal variant of research direction. Selection of the research topic and substantiation of its relevance. | Reviewing text, R&D report. | Possible research directions review has been presented. | Possible research directions review has been presented in detail. | Deep and detailed reviews, the analysis of relevant and possible research directions have been given. |
| | | Substantiation of optimal variant of research direction has been presented. | Substantiation of optimal variant of research direction has been presented and the examples of their possible implementation in practice have been given. | Substantiation of optimal variant of research direction has been presented, the examples of their possible implementation in practice have been given and the relevance has been revealed. |
| <i>Number of points</i> | | 10 | 15 | 20 |
| Research plan (program) development. | Research plan, R&D report. | Typical research plan (program) has been given. | Typical research plan (program) has been given with author's corrections. | Original research plan (program) has been given. |
| <i>Number of points</i> | | 10 | 20 | 30 |
| Stage 2 (semester 7). Theoretical analysis of subject area | | | | |
| Refinement of the purpose, tasks, objects and subject of the research; Selection and review of the domestic and abroad scientific, monographic literature and periodicals. | Text of theoretical chapter, R&D report | Typical model of the studied object has been given. | Typical model of the studied object with author's corrections has been given. | Original, independently created model of the studied object has been given. |
| <i>Number of points</i> | | 15 | 25 | 35 |
| Collection, processing, analysis and systematisation of initial information on subject area. Preparation of scientific and technical report (internship report). | R&D report | Scientific and technical report has been provided. | Scientific and technical report with author's corrections has been provided. | Original scientific and technical report has been provided. |
| <i>Number of points</i> | | 5 | 7 | 10 |
| Total number for 1 - 2 stages | | 40 | 70 | 100 |

The evaluation of R&D results in 7th semester is carried out on a 100-point scale, taking into account the following provisions:

- if R&D is scored 49 points and below, it is marked «unsatisfactory»;
- if R&D is scored within 50 to 69 points, it is marked «satisfactory»;
- if R&D is scored from 70 to 85 points, it is marked «good»;
- if R&D is scored from 86 to 100 points, it is marked «excellent»;

Table 4.2 Assessment criteria for the levels of competency development during the internship in 8th semester.

| Activity, control tool | | Evaluation tools and scores | | |
|---|----------------------|-----------------------------|--------------------------------|--|
| | | Threshold | Advanced | High |
| Organization stage | Organization meeting | Assistance | Assistance and Posed Questions | Assistance, Proposal of Research Topic |
| <i>Number of points</i> | | <i>1</i> | <i>2</i> | <i>3</i> |
| Stage 3 (semester 8). Experimental research of the subject area. | | | | |

| | | | | |
|---|--|---|--|--|
| Comparison of the information resources analysis results with the results of theoretical and experimental research. | Text of experimental chapter, R&D report | Sufficient interpretation of the obtained results | Complete and deep interpretation of the obtained results | Complete and deep interpretation of the obtained results |
| <i>Number of points</i> | | <i>10</i> | <i>15</i> | <i>20</i> |
| Evaluation of effectiveness of the obtained results | Text of experimental chapter, R&D report | Theoretical model of evaluation of the obtained results effectiveness has been presented. | The model of evaluation of the obtained results effectiveness, verified experimentally, has been presented. | Original model of evaluation of the obtained results effectiveness, verified experimentally, has been presented. |
| <i>Number of points</i> | | <i>10</i> | <i>15</i> | <i>20</i> |
| Stage 4 (semester 8). Summing up and evaluation of the research results. | | | | |
| Comparison of the information resources analysis results with the results of theoretical and experimental research. | Recommendations for the use of the results have been prepared. | Evaluation of the obtained results effectiveness in the form of a final report. | Evaluation of the obtained results effectiveness has been performed; recommendations for the use of the research results have been prepared. | Comparison of the information resources analysis results with the results of theoretical and experimental research has been performed independently by the author. . |
| <i>Number of points</i> | | <i>10</i> | <i>15</i> | <i>20</i> |
| Preparation of the final report. | Final report. | Final report has been presented. | Final report with the author's corrections has been presented. | Original report with author's corrections has been presented |
| <i>Number of points</i> | | <i>10</i> | <i>15</i> | <i>20</i> |
| Total number for 3 -4 stages | | <i>50</i> | <i>75</i> | <i>100</i> |

The evaluation of R&D results in 4th semester is carried out on a 100-point scale, taking into account the following provisions:

- if R&D is scored 49 points and below, it is marked “unsatisfactory”;
- if R&D is scored within 50 to 69 points, it is marked “satisfactory”;
- if R&D is scored from 70 to 85 points, it is marked “good”;
- if R&D is scored from 86 to 100 points, it is marked “excellent”;

5 List of Teaching Materials and Internet Resources Necessary for the Internship's Organization

5.1 Paper-based Courseware

| № | Bibliographic entry (author, title, mode of publication, place, publishing house, year of publication, number of pages) |
|-----------------------------------|--|
| 1 General literature | |
| 1 | Anderson T., Dahlin M. Operating systems: Principles and Practice (Second Edition). Recursive Books, Ltd., 2011-2015. |
| 2 | Stroustrup B. The C++ Programming Language. Fourth Edition. Pearson Education. Addison-Wesley, 2013. |
| 3 | Web Service Platform Architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and More. N.Y.: Prentice Hall, 2005. – 456 p. |
| 4 | Cattell R.G., Barry D.K. The Object Data Standard: ODMG 3.0. Morgan Kaufmann Publishers, 2000. |
| 2 Supplementary literature | |
| 1 | Tanenbaum A.S. Modern Operating Systems. Second Edition. Prentice-Hall, 2001. – 984 p. |
| 2 | Lewis, R. D. When Cultures Collide: Managing Successfully Across Cultures / R. D. Lewis, N. Brealey. – L. : Publishing House, 2000. |
| 3 | Eckel B., Allison Ch. Thinking in C++. 2 nd Edition. Volume Two: Practical Programming, 1999. – 592 p. |
| 4 | Eckel B. Thinking in C++. 2 nd Edition. Volume 1: Thinking in C++, 1999. – 857 p. |

5.2 Electronic Courseware and Internet Resources

| Name of training tool | Reference to information resource | Accessibility of EBN (Internet / local net; authorized / free assess) |
|--|---|---|
| Scientific Library of Perm National Research Polytechnic Research University | https://elib.pstu.ru | Internet network / authorized assess |
| Lan' electronic library system | https://e.lanbook.com | Internet network / authorized assess |
| IPR books Electronic library system | http://www.iprbookshop.ru/ | Internet network / authorized assess |
| Urait Electronic library system | https://urait.ru/index.php | Internet network / authorized assess |

6. List of Software and Computing Required for the Internship

6.1 List of Software

Table 6.1 Software Configuration

| N ^o | Type of Software | Per. number | Purpose |
|----------------|---------------------------------------|-------------|--|
| 1 | Operating System Microsoft Windows | 42615552 | Applied software to work with spreadsheet application, processors; to work with databases; to work with integral packages; |
| 2 | Microsoft Office | 42661567 | Office software suite for working with various types of documents: texts, spreadsheets, databases, and others. |

6.2 List of Inquiry Systems

Table 6.2 Composition of Inquiry Systems and Databases

| Inquiry System Type | Name of Inquiry System |
|---------------------|---|
| Electronic resource | Federal State Statistics Service https://rosstat.gov.ru/ |
| Electronic resource | Information resources of Consultant+ web http://www.consultant.ru/sys/english/ |

7 Description of Material and Technical Base Necessary for the Internship's Organization.

To realize internship process in full form for the bachelors in training program 15.03.06 *Mechatronics and Robotics*, direction *Robotics in computer-aided production* the students are provided with access to multimedia classrooms and computer classes.

The internship passing is oriented to the independent learning activity under the guidance and control of the internship advisor of practical training from the Department (Information Technologies and Automated Systems), where a student passes the internship. It disposes (within Electrical Engineering Faculty) classrooms provided with necessary training tools. To perform individual tasks and to write the report, the students are provided with access to these classrooms equipped with necessary software and access to the Internet.

To perform the individual tasks and written reports students are provided with access to a PC with the standard set of software and the Internet.

Table 7.1 Multimedia classrooms and computer classes

| Sl. N ^o | Rooms | | | Area, m ² | Seating capacity |
|--------------------|--|--|---------------------|----------------------|------------------|
| | Name | Placement (department) | Number of classroom | | |
| 1 | Classroom for practical training, computer classroom | Department of Information Technologies and Automated Systems | 126, Bld. A | 80 | 30 |

Table 7.2 Training Equipment

| № | Name and branding of equipment | Quantity, pcs | Form of possessing (ownership/ operative administration/ rent, etc.) | Number of classroom |
|----------|--|----------------------|---|----------------------------|
| 1 | 15 computers Pentium Core 2 Duo E8400/RAM-2Gb/DVD-RW, connected with local network, with permanent access to Wi-Fi | 15 | operative administration | 126, Bld. A |
| 2 | Multimedia projector of ceiling bracket and projection screen | 1 | operative administration | 126, Bld. A |
| 3 | Structured cabling system subsystem | 1 | ownership of the Department | 126, Bld. A |
| 4 | 3D printer | 1 | operative administration | 126, Bld. A |
| 5 | Complex of training robotics systems | 5 | operative administration | 126, Bld. A |

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_____ V.G. Sheremetyev

AGREED BY

Head of Educational Programs Administration,
PhD in Technical Sciences

_____ D.S. Repetsky

The title page form of the Internship report

Ministry of Science and Higher Education of the Russian Federation
Federal State Autonomous Educational Institution of Higher Education

Perm National Research Polytechnic University

Electrical Engineering Faculty
Department "Information Technologies and Automated Systems"
Field of studies: 15.03.06 Mechatronics and Robotics

REPORT **on the Research Internship**

Research topic

Performed by the student gr. _____

(Full name)

(Signature)

Verified by:

(position, full name of practical training advisor from the department)

(mark)

(signature)

(date)

Perm 2021

Supplement 2

The form of work schedule (plan) with the individual internship task

Ministry of Science and Higher Education of the Russian Federation
Federal State Autonomous Educational Institution of Higher Education

Perm National Research Polytechnic University

Electrical Engineering Faculty
Department “Information Technologies and Automated Systems”
Field of studies: 15.03.06 Mechatronics and Robotics

APPROVED BY

Head of the department
“Information Technologies and
Automated Systems”,
Doctor of Economics, Professor

_____ R.A. Fayzrakhmanov
_____ 20__

Working Schedule of the Internship

Form of the Internship: Work experience training

Type of the Internship: Research

Place of the Internship: Department of Information Technologies and Automated Systems

Time and duration of the Internship: _____

Academic group: _____

AUTHOR:

(position, full name of practical training advisor from the department)

(mark)

(signature)

Perm 2021

Individual internship task of a student from the group _____

(Full name)

1. The topic of the individual task: _____

2. Goal: Developing competences in accordance with the requirements of the internship program:

PC-1. Is able to participate in scientific research and projects development, to make theoretical research and computing experiments using standard software in order to produce mathematical models of processes and objects of mechatronics and robotics.

PC-2. Is able to perform calculations and design of individual units and devices, as well as select standard measuring and computer equipment for the implementation of mechatronic and robotic systems.

3. Working schedule (plan) of the internship (R&D)

| | Name of the stage | Form of work | Place of work performance (subdivision) | Time frame | | Mark of work performance (grade and signature of scientific advisor from the department) |
|--|-------------------|--------------|---|------------|--------|--|
| | | | | start | finish | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

4. Place of internship: _____

5. The time of student's report on the internship to the practical training and review:

6. Content of the report:

7. Requirements for the developed reporting documents

The Internship report should be compiled in accordance with the requirements of State Standard 7.32–2017 “System of standards on information, librarianship and publishing. Report on research work. Structure and rules of drawing up.”

The content of the report should be not less than 15 pages (without regard to the supplements) of typescript text (font 14 point size, Times New Roman, 1.5 intervals). The report must be printed on A4 format and filed in a folder. Working schedule (plan) of the internship follows after the main body of the report.

Advisor of the practical training from the department _____ (_____)
(signature) (full name)

The task is accepted and carried out _____ (_____)
(signature) (full name)

“ _____ ” _____ 20__

Changes worksheet

| Sl.№ | Substance of changes | Date, № of the department meeting protocol. Signature of the Head of the department |
|------|----------------------|---|
| | | |
| | | |
| | | |
| | | |